TRANSIT COMMUNICATIONS FOR PASSENGERS WITH HEARING IMPAIRMENTS

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Executive Summary

The ultimate goal of this program is to develop a transit communication program for deaf, hard of hearing, and low-English skill populations. This report describes the results of a pilot (Phase I) collaborative project aimed at improving interactive communication between transit workers and deaf or hard of hearing passengers. The participants included a cross-section of the deaf population including Oral and American Sign Language (ASL) users, and transit workers. The study included a preliminary analysis of passenger communication needs, a study of operator communication issues, the development of video for transit operator training, and the design of a preliminary visual communication tool. Among the conclusion of this preliminary study are:

- Communication method must not rely on human interpreters.
- Video sensitivity training of transit operators appears to be effective.
- Developed principles for an icon-based visual language tool as an effective approach to meaningful interactive communication.
- Transit operators can identify important communication conditions.

The results of this study provide support for the potential of visual communication and suggest approaches involving progressive development of technology-based communication systems for the transportation systems for the next millennium.

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Project Overview

Interactive communication between transit riders and operators is an important component of a successful transportation system. There is a significant subset of population whose communication skills based on English language are low. These include deaf (ASL and Oral), hard of hearing, non-English speakers, etc. The communication needs of these groups have not been adequately addressed because the barriers are not as apparent as for those with physical conditions. Special communication tools need to be employed in order to provide equal access for these subsets of the population

The main goal of this project was to explore a number of issues that underlie the development of communication capabilities for these groups. The project consists of preliminary analysis of rider communication needs, transit operators opinion survey, production of a sensitivity training video, and the development of preliminary visual communication tool.

The participants in this project represent a cross section of the deaf population that includes those who are oral deaf (speak and read lips only), language combinations of English and ASL (American Sign Language) deaf, and those who communicate only using ASL (a picture language for the most part best compared to Japanese written picture language called Konji). It must be noted that those using only ASL can have minimal or no English written or comprehension skills or understanding (only a very small percentile of the overall population). To maximize Project ACTION's investment in this project the activities were dovetailed with a number of concurrent projects concerned with communication methodologies between the deaf and the public.

Analysis of Rider Communication Needs

Task Analysis

Passengers' ability to utilize effectively a mass transportation system depends critically on the availability of useful information at the appropriate time. The availability of information is essential during all phases of a trip including planning, entrance onto the vehicle, stay on board of the vehicle, and exit. The focus of this project is information needs during the passengers' utilization of vehicles.

One way to determine a passenger's information needs is to perform a task analysis of his transportation utilization processes. The results of a task analysis enable us to develop a model of the rider's decision processes, and subsequently his/her information needs.

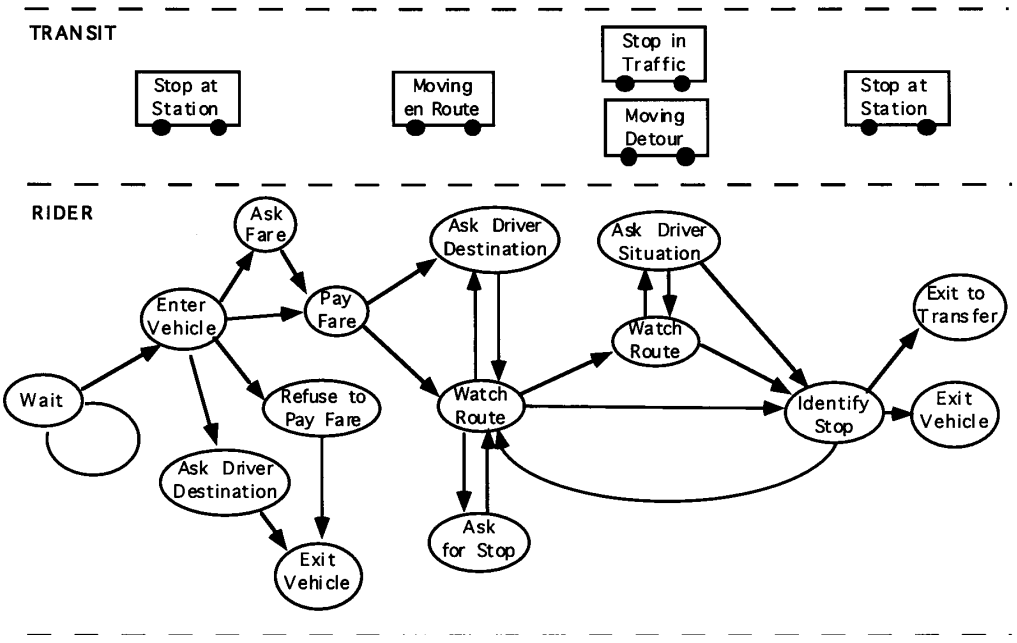

Figure 1 Diagram illustrating a riders states (situation descriptors) and decisions

A diagram representing a preliminary task analysis is shown in Figure 1. The top of the diagram illustrates a simplification of the state of the transit vehicle. The bottom indicates a set of simplified states of the rider. The important aspect of this type of analysis is that any transition from each state is associated with a decision, and therefore requires information for the rider.

Language Skills

Language use and its understanding is quite variable within the rider population in general, and the deaf population in particular. The high variability is due to many factors including education and the lack of language standardization. Because of the variability of individual language skills, and the need to serve the entire population, the proposed communication tools must be designed for those with the minimal capabilities. At the same time the techniques must be capable of encompassing most of the critical passenger communication needs. The complexity of the problem demanded that the design be guided by a team.

Design Team

In order to guide the design of effective communication tools, a team of individuals was required. The team consisted of operators, administrators, and representative riders from the cross-section of the deaf population.

Design Criteria

The most important outcome of the design team deliberation was a set of criteria to be used in the design of communication tools for the mass transportation systems. Perhaps the most significant criterion that resulted from the design team deliberation was that the communication tool must perform without a third party, i.e., without interpreters. The following is a list of the developed criteria:

1. Usability - ease of use by both operator and deaf passenger.
2. Cost effectiveness.
3. Minimal negative impact on the operator workload
4. The set of communication devices should be small to minimize the interference with the transit operators' tasks.
5. No need for a third party interpretation, independent one on one communication.
6. Anonymity (not being singled out as being deaf) was key to the selection of communication methodologies, tools, signs, and identification.
7. Minimize training necessary for operators and passengers
8. Appeal
9. Completeness

Target Populations

As noted above there are several subsets of the U.S. population that would benefit from the results of this project with respect to improvements in communication.

Deaf and Hard of Hearing

Population application include Oral Deaf, ASL deaf (American Sign Language), language combinations of English and ASL, ASL only, deafened due to aging, late deafened due to injuries and illness. Those deaf who have traveled in foreign countries using International Pictograms (or picture forms of communication) have found it significantly easier to be self sufficient and required minimal, if any, assistance from a third party.

Learning Disabled

Learning disabilities span a wide range of symptoms including perceptual deficiencies, attention disorders, etc. Because of the subtle effects of learning deficits, the proportion of affected population is difficult to estimate. Some estimates suggest that as many as 25% of the U.S. population suffers from some degree of learning disability. There is evidence that the use of a visual communication language could improve effectiveness of communication for this underserved population. (William W. Hartner, President H.E.L.P., Marylhurst College, Marylhurst, Oregon 1995).

Non-English Speaking

International picture type language has been used successfully in many countries throughout the world. It is, therefore, likely that applications of pictograms within public transportation will successfully aid in communication for the non-English speaking passengers. The effectiveness of the visual communication system for this population must be examined.

Study of Operators' Opinions

It is without doubt that effective communication is an essential part of any successful mass transportation system. This study was designed to investigate transit operators' opinions regarding selected aspects of the communication between riders and transit operators from the point of view of transit operators. The main goal of the study of operator opinions was to determine the operators' view of the importance of various communication needs, their frequency, and the impact on the transit operators' performance. The study employed the following questionnaire instrument.

Questionnaire Instrument

A copy of the questionnaire is included in the Appendix. The questionnaire was designed with two sections. The first section consisted of 19 questions and addressed various messages from the operators to the riders. The respondents answered the following two questions about each message:

1) Importance of each message to be given to the passengers. The importance was rated on a four-point scale ranging from "Not at all important" to "Very important".

2) Frequency for the message. The frequency of each message was rated on a five-point scale ranging from 'Once an hour" to "Once a year".

The second section was focused on passenger questions and requests to the transit operators. This section consisted of 19 questions, and the respondents answered three questions about each request.

1) Frequency of each request was rated on a four point scale from "Once a month" to "Once an hour".

2) Amount of interference was rated on a four point scale from "Not interfering" to "Very interfering. The purpose of this question was to assess the transit operator’s opinion of the increased workload due to each type of request.

3) Amount of annoyance was rated on a four point scale ranging from "Not at all annoying" to "Very Annoying".

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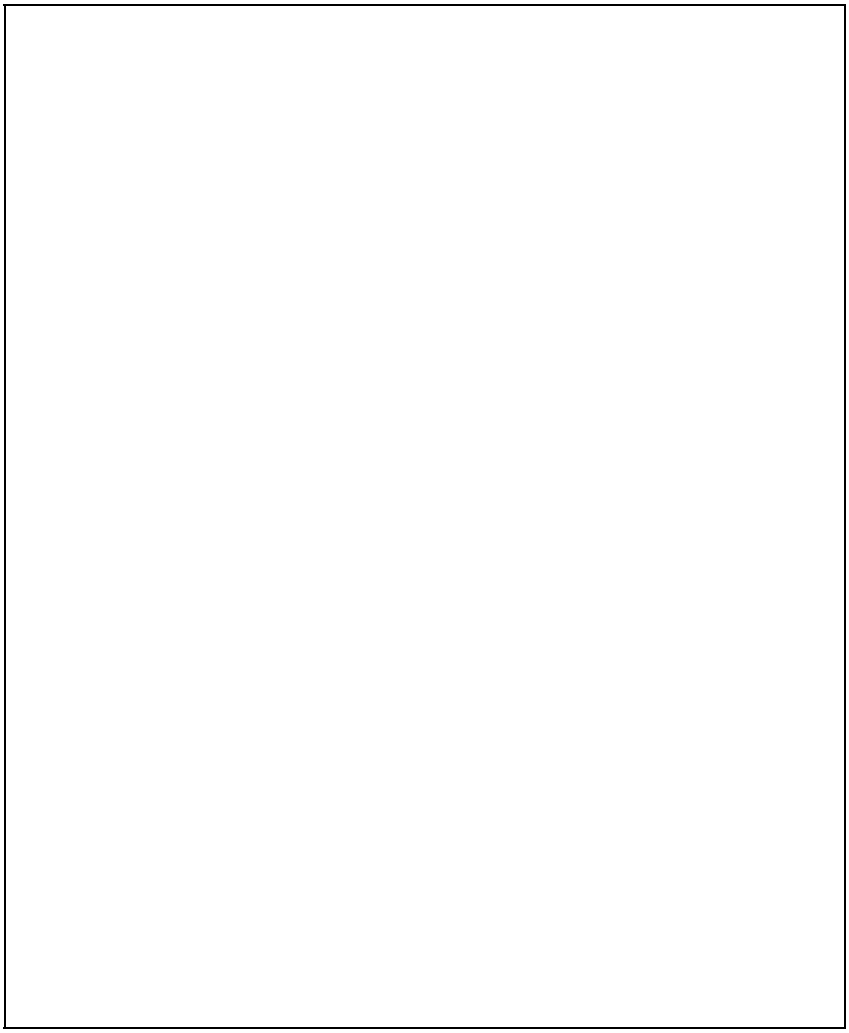
Figure2 Averaged ratings of *message importance* (designated by the light bars), and the average frequency (designated by the dark bars).

Population

The described questionnaire-based survey was administered to a sample of 21 transit operators. This group of respondents was composed of 7 individuals from each of three TriMet Centers in the Portland area.

Results

The results of the first and second section of this survey are shown in Figure 2, and Figure 3, respectively. Both figures show the average responses of all the participants in this study.



Rating

Figure 3 Averaged ratings from the second part of the questionnaire. The average amount of interference is represented by the dark bars, the request annoyance by light bars, and the average frequency by the gray bars.

The bar graph in Figure 2. shows the importance and the frequency of various messages. In order to aid in an intuitive interpretation, the numerical value of the importance measure has been transformed linearly so that larger values correspond to more important messages. The messages in this graph were sorted according the average importance rating, with the most important message on the top of the graph. As expected the most important messages concern those communication supporting the decisions and action of the rider.

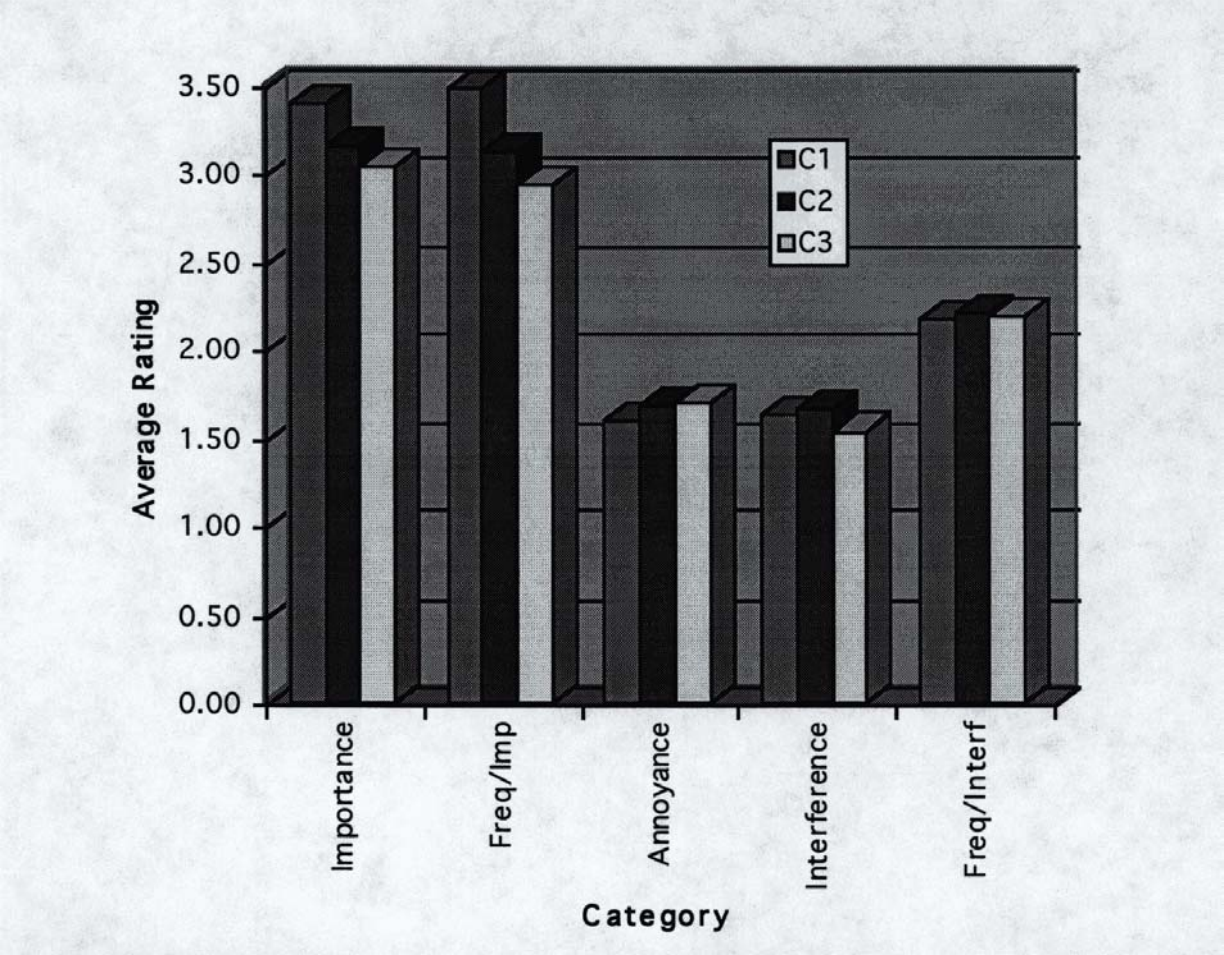


Figure 4 Ratings averaged over all questions for each of the three centers.

The bar graph in Figure 3. indicates the ratings of the riders requests and questions from the second part of the questionnaire. The requests in the graph were sorted in accordance with the amount of interference.

In order to determine whether there are differences among the three centers we averaged all responses in each category for each center. The resulting averages are shown in Figure 4. The fact that the average responses for all centers are remarkably similar suggests that there are no significant differences among locations of the transit operators.

Development of Training Video

The purpose of the video material is to sensitize transit operators to the problems in communication with deaf population and to suggests various techniques to improve their communication skills. The video entitled "*Communication and Your Deaf Passenger*" has four sections. The goals of the sections are:

1. To identify the types of communication used by the deaf. An important point made in this section of the video is that deaf people are difficult to identify until one attempts to communicate verbally. The video describes four types of communication used by the deaf:

    - Oral - lip-reading
    - American Sign Language (ASL)
    - Combination of Oral and ASL
    - Home signs

2. To illustrate various types of good and bad interactions between a transit operator and a deaf rider.

3. To identify a variety of available nonverbal communication tools such as writing or speaking for lip-reading oral deaf. This portion provides examples of various verbal and non-verbal communication techniques, and introduces the potential of visual communication language using pictograms.

4. To refine the tools. Examples include

    - Positioning - to face the deaf person
    - Articulation of words
    - Speaking slower
    - Impact of facial hair

An informal evaluation of the video by a small number of professionals and by several deaf individuals indicated that the result is a successful training tool.

Development of a Visual Communication Tool

The initial design of the visual communication tool was the result of the collaborative effort of the members of the design team.

One important conclusion of the design team was to base the development of the visual language on a subset of icons from the standardized set of International Pictograms. In this manner, the development of the visual communication tools would benefit from the experiences obtained with the existing signs. Some of the existing pictograms had to be modified to serve the deaf population in the specific transit-related situations.

Another important conclusion was to amend each pictorial representation by a descriptive English word or a phrase. It is expected that the English language descriptor will aid some riders and many operators in learning the meaning of the signs.

Another important characteristics of the signs is its visibility. The design team decided to design the pictograms with white foreground and blue background. This type of design appeared to be effective in improving the sign intelligibility.

In order to develop an easily usable communication tool, the design team decided to limit the number of signs to twelve. The initial selection included the following signs:

1. Last stop
2. Delay less than 10 minutes.
3. Delay more than 10 minutes.
4. Delay Breakdown
5. Delay Flat tire
6. Delay Bridge up
7. Detour(s) Construction
8. Detour(s) Accident
9. Detour(s)Weather
10. Detour(s)Snow
11. Detour(s) Rain
12. Medical/First Aid

Copies of these signs are included in the appendix.

Participating Deaf Organizations

In order to maximize the generalizability of the results, major US centers for the deaf were contacted throughout the country to elicit feedback regarding various aspects of this project. The selection of these centers was based on a number of considerations maximizing the range of differing climates and regional needs. Of the 38 centers contacted the following 11 centers provided significant feedback (Addresses are listed in the Appendix):

1. GLAD COUNCIL ON DEAFNESS INC, Los Angeles, CA;
2. DEAF SERVICE CENTER, Tampa, FLA;
3. GEORGIA COUNCIL FOR THE HEARING IMPAIRED INC - SERVICE CENTER FOR THE DEAF AND HEARING IMPAIRED, Decatur, GA;
4. DEAFNESS AND HEARING IMPAIRED COUNCIL OF S.E. PENNSYLVANIA ELWYN-NEVIL CENTER FOR THE DEAF AND HEARING IMPAIRED, Philadelphia, PA;
5. TEXAS COMMUNITY FOR THE DEAF AND HEARING IMPAIRED, Austin, TX;
6. AURORA OF CENTRAL NEW YORK - DEAF SERVICES, Syracuse, NY.;

7. HAWAII STATE COORDINATING COUNCIL ON DEAFNESS, Honolulu, HI;
8. DEAF SERVICES; St. Louis, Missouri;
9. COMMUNITY SERVICE CENTER FO THE DEAF AND HARD OF HEARING, Seattle, WA;
10. TENNESSEE COUNCIL FOR THE HEARING IMPAIRED, Nashville, TN;
11. ALASKA CENTER FOR BLIND AND DEAF ADULTS, Anchorage, AK;

Other Collaborating Organizations

Value-added participants resulting from the content value of this project:

- Oregon Health Sciences University
- C-Tran Vancouver, Washington public transportation
- City of Portland Office of International Relations
- Target
- Biomedical Information Communications Center
- Department of Economics, Canada Transportation, Quebec
- USWest Communications
- Lewis and Clark College
- Tucker Maxon Oral School
- KGW Station
- KATU Station manager (J. Bayer)
- Portland Public Schools
- Army Corps of Engineers
- Internal Revenue Service

SAMPLE COPY OF

OPERATOR & RIDER SURVEY

PASSENGER INFORMATION SURVEY

As part of a demonstration contract for a communication project to the Oregon Deaf Resource Center, we are planning to develop systems that will make it easier for you to work with the members of the deaf community. We need your help to determine the types of information that is important to communicate to riders, how often this information is needed, and how important it is to our customers.

Below is a list of various types of information that you may need to communicate to your customers. For each one, I'd like you to tell me if the information is very important, somewhat important, not very important or not at **all important for customers to know. Then, I would like to know about how frequently you need to communicate this information to customers: once a year, once a month, once a week, once a day, or once an hour.**

A. How important do you think it is for customers to know about a **delay due to a accident?** How often do you need to tell customers about a **delay due to an accident?**

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

B. How important do you think it is for customers to know about a **delay due to construction'?** How often do you need to tell customers about **a delay due to construction?**

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

C. How important do you think it is for customers to know the **amount of fare required?**
How often do you need to tell customers the **amount of fare required?**

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day .
		5	Once an hour

D. How important do you think it is for customers to know about a **delay due to bridge up**
How often do you need to tell customers about a **delay due to bridge up?**

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

E. How important do you think it is for customers to know this is the **last stop --all passengers must exit?**
How often do you need to tell customers this is the last **stop-all passengers must exit**?

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

F. How important do you think it is for customers to know there is a **delay due to snow?**
How often do you need to tell customers there is a **delay due to** snow?

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

G. How important do you think it is for customers to know there is a **delay due to rain?** How often do you need to tell customers there is a **delay due to rain?**

Importance		Frequency	
1	Very important	I	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

H. How important do you think it is for customers to know **how** to **transfer to other lines?** How often do you tell customers **how to transfer to other** lines?

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

1. How important do you think it is for customers to know the **operating hours for this line?** How often do you tell customers the **operating hours for this** line?

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

J. How important do you think it is for customers to know **where to catch the return bus?** How often do you tell customers **where to catch the return bus?**

Importance		Frequency	
1	Very important	I	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

K. How important do you think it is for customers to know **how to get to the Visitor/Information Center?**
How often do you tell customers **how to get to the Visitor/Information Center?**

Importance		Frequency	
1	Very important	I	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

L. How important do you think it is for customers to know **how to get** to **the library?**
How often do you tell customers **how to get to the library?**

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

M. How important do you think it is for customers to know **how to get to the Post Office?**
How often do you tell customers **how to get to the post office?**

Importance		Frequency	
1	Very important	I	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

N. How important do you think it is for customers to know **how to get to the Train Station'?**
How often do you tell customers **how to get to the train station?**

Importance		Frequency	
1	Very important	I	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

0. How important do you think it is for customers to know **how to get to the Airport?** How often do you tell customers **how to get to the airport?**

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

P. How important do you think it is for customers to know to exit **through the back door?** How often do you tell customers to **exit through the back door?**

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

Q. How important do you think it is for customers to know a **person with a mobility device is boarding?**
How often do you tell customers that **a person with a mobility device is boarding?**

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

R. How important do you think it is for customers to know **how long their transfer is valid?**
How often do you tell customers **how long their transfer is valid?**

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

S. How important do you think it is for customers to know where to get schedule
How often do you tell customers where to get a schedule?

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

Questions T. Through W. May be optionally used to gather additional information.

T.

Importance		Frequency	
1	Very important	I	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

U.

Importance		Frequency	
1	Very important	1	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

V.

Importance		Frequency	
1	Very important	I	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

W.

Importance		Frequency	
1	Very important	I	Once a year
2	Somewhat important	2	Once a month
3	Not very important	3	Once a week
4	Not at all important	4	Once a day
		5	Once an hour

Below is a list of questions riders may ask you during the course of your shift. For each one, please indicate how frequently the question is asked, how much this type of question typically interferes with your work and how annoying the question is.

A. How much is the fare to...

Frequency	Amount of Interference	Annoyance Factor
I Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

B. Do I need exact change?

Frequency	Amount of Interference	Annoyance Factor
I Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

C. Why is the fare so high?

Frequency	Amount of Interference	Annoyance Factor
I Once a month	1 Does not interfere	I Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

D. Where is this bus going/Does this bus go to .... ?

Frequency	Amount of Interference	Annoyance Factor
I Once a month	1 Does not interfere	I Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

E. How do I get to .... ?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	I Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

F. Why are you going so slow?

Frequency	Amount of Interference	Annoyance Factor
I Once a month	1 Does not interfere	I Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

G. Why are you going so fast?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

H. Why did you make this turn?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	I Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

I. Where do I get off to go to ... ?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	I Does not interfere	I Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

J. What is the next stop/station?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

K. How far is it to ... ?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	I Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

L. When is the next bus?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

M. **What time is the last bus to...**

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	I Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

N. Where is the stop for my return trip?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

0. Can I talk to your supervisor?

Frequency	Amount of Interference	Annoyance Factor
I Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

P. How do I retrieve something from Lost and Found?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

Q. What is your badge/employee number?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

R. What is Tri-Met's phone number?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	**4** Very interfering	4 Very annoying

S. Would you let me off right here?

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

T.

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

U.

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

V.

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	1 Does not interfere	1 Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

W.

Frequency	Amount of Interference	Annoyance Factor
1 Once a month	I Does not interfere	I Not at all annoying
2 Once a week	2 Interferes a little	2 Not very annoying
3 Once a day	3 Moderately interfering	3 Somewhat annoying
4 Once an hour	4 Very interfering	4 Very annoying

ALASKA CENTER FOR DEAF/BLIND ADULTS
731 GAAMELL ST #200
ANCHORAGE, AK 99501
TTY (907) 258-2232
FAX (907) 279-0341

GLAD COUNCIL ON DEAFNESS INC (GLAD)
2222 LAVERNA AVE
LOS ANGELES, CA 90041
V/TTY (213) 478-8000
FAX (213) 478-8016

OAKLAND OUTREACH
1539 WEBSTER ST
OAKLAND, CA 94612
V/TTY (510) 25l-6400
FAX (510) 465-7107

(ABOUT SAN FRANASCO, IT IS NOT ON TDI LISTS, I CHECKED 3 BUT THERE HAVE DEAF CENTER OUT OF SF, SO GIVE DCARA ADDRESS AT OAKLAND.....)

DEAF PRIDE ADVOCATE
1350 POTOMAC AVE SE
WASHINGTON, DC 20003
V/TTY (202) 675-6700
FAX (202) 547-0547

DEAF SERVICE ENTER OF PALM BEACH CITY
5730 CORPORATE WAY #230
WEST PALM BEACH, FL 33407
V/TTY (407) 478-3903
FAX (407) 478-5630

DEAF SERVICE CENTER
1801 N WESTSHORE BLVD #2
TAMPA, FL 34677
TTY (813) 876-3215

DEAF SERVICE CENTER OF BROWARD CITY
5750 MARGATE BLVD #106
MARGATE, FL 33063
V/TTY (305) 977-0200
FAX (305) 971-7421

MANATEE-SARASOTA DEAF SERVICE CENTER
5107 14TH ST WEST
BRADENTON, FL 34207
V/TTY (813) 758-2539
FAX (813) 758-3564

DEAF AND HARD OF BEARING SERVICE CENTER
116 S PALMETTO AVE
DAYTONA BEACH, FL 32114
V/TTY (904) 257-3600

DEAF SERVICE CENTER OF GREATER ORLANDO
3191 MARGUIRE BLVD #246
ORLANDO, FL 32803
V/TTY (407) 897-1481

ATLANTA DEAF ACTION CENTER
1770 BOLTON RD NW
ATLANTA, GA 30318
TTY (404) 729-8694

GEORGIA COUNCIL FOR THE HEARING MTAIRED INC -
SERVICE CENTER FOR TT-IE DEAF AND HARD OF BEARING
4151 MEMORIAL DR #103-B
DECATUR, GA 30032
V/TTY (404) 292-5312

DEAFNESS AND BEARING MTAIRED COUNCIL OF SE PENNSYLVANIA
ELW'YN-NEVU, CENTER FOR THE DEAF AND BEARING *IW*
4031 LUDLOW ST.
PHILADELPFRA, PA 19104
TTY (215) 895-5695 (ELWYN-NEVIL CTR F/T DEAF & HEARING IMPAIRED)
VV/TTY (215) 895-5601 (DEAFNESS & HRG @D CNCL OF SE PA)
FAX (215) 386-4436 (ELWYN-NEVU, CTR F/T DEAF & HEARING IMPAIRED)

HAWAII SERVICES ON DEAFNESS
V/TTY (800) 945-3533

HAWAII STATE COORDINANNG COUNCIL ON DEAFNESS 500 ALA MOANA BLVD #5-210
HONOLULU, I-H 96813
V/TTY (808) 586-8130
FAX (808) 548-7795

COMMUNITY SERVICE CENTER FOR THE DEAF AND HOH 1609 19TH AVE
SEATTLE, WA 98122
V/TTY (206) 322-4996
FAX (206) 322-5772

DEAF ACTION CENTER
3115 CRESTVIEW DR
DALLAS, TX 75235
V/TTY (214) 521-0407
FAX (214) 521-3658

GOODRICH CENTER FOR THE DEAF
2500 LIPSCOMB ST
FORT WORTH, TX 76110
TTY (817) 926-4101
FAX (817) 921-9528

ANSWERING SERVICE FOR THE DEAF
637 KELSO DR
DALLAS, TX 75211
TTY (214) 339-0702

SAN ANTONIO CNCL FOR SVCS F/T DEAF
2803 E COMNMRCE ST
SAN ANTONIO, TX 78203
V/TTY (210) 223-9200

TEXAS COUNCIL FOR THE DEAF 2201 POST RD #100
AUSTIN, TX 78704
TTY (512) 488-6597

TEXAS COMMUNITY FOR THE DEAF AND HEARING IMPAIRED
4800 N LAMAR #3 10
PO BOX 12904
AUSTIN, TX 78711
V/TTY (512) 451-8494 / (512) 469-9891
FAX (512) 451-9316

(HOUSTON: DEAF SERVICES IS NOT ON TDI PHONE LISTS BUT THERE HAVE SOME DEAF SERVICES AROUND AUSTIN AND SAN ANTONIO, MAYBE YOU WANTS THESE SO I GIVE YOU THE LISTS OF THESE IN CASE, THANK!!!!)

HORRY CITY DEAF SERVICES CENTER - COASTAL SUNSHINE ASSN.
1551 21ST AVE N. #3
MYRTLE BEACH, SC 29577
TTY (803) 626-8046
FAX (803) 626-8046

CHARLESTON COUNCIL FOR THE DEAF
PO BOX 21601
CHARLESTON, SC 29413
TTY (803) 724-6529

GREENVILLE COMMUNITY SERVICES FOR THE DEAF
811 PENDLETON ST/9-11 MEDCIAL CENTER
GREENVIILLF-, SC 29601
V/TTY (803) 235-6065

THRESHOLDS BRIDGE FOR THE DEAF
4814 N CALIFORNIA ST
CHICAGO, IL 60625
TTY (312) 989-1875
FAX (312) 989-1075

DEAF SOCIAL SERVICE PROVIDERS OF CI-HCAGO
CHICAGO, IL
V/TTY (312) 536-8405

NORTH SHORE ARC. DEAF SERVICES
64 HOLTEN ST
DANVERS, MASS 01923
TTY (508) 762-4873
FAX (508) 777-6149

(BOSTON IS NOT ON TDI LISTING BUT HAVE ONE DEAF CENTER AT MASS SO I GIVE YOU THEIR ADDRESS HERE.....

DEAF INC
801-07
CELAR ROLLA, MO 65401
V/TTY (314) 341-3442

ROCK HILL DEAF CENTER
9512 MANCHESTER RD
ROCK FML, MO 63119
TTY (314) 968-4761

DEAF SERVICES
200 S HANLEY #1 104
ST LOUIS, MO 63105
V/TTY (314) 721-3744

GREATER KANSAS CITY ASSN. OF THE DEAF, INC
PO BOX 7037
KANSAS CITY, MO 64113
TTY (816) 361-5013

KANSAS CITY RAINBOW ALLICANCE OF THE DEAF
PO BOX 10252
KANSAS CITY, MO 641 11
TTY (913) 780-1995

NEW YORK SOCIETY FOR THE DEAF
817 BROADWAY 7TH FLOOR
NEWYORK, NY 10003
V/TTY (212) 777-3900
FAX (212) 777-5740

AURORA OF CENTRAL NEW YORK - DEAF SERVICES
616 S SALINA ST
SYRACUSE, NY 13202
T/TTY (315) 422-9746
FAX (315) 422-4792

DEAF WORKS INC
PO BOX 352
WOODBURY, NY 11797
TTY (516) 364-3899
FAX (516) 364-4612

BROOKLYN SOCIETY OF THE DEAF INC
2910-B CONEY ISLAND AVE
BROOKLYN, NY 11235
TTY (718) 648-8291

CAPITAL DISTRICT DEAF CENTER INC
440 NEW KARNER RD
ALBANY, NY 12205
(518) 464-0635

PICTURE GRAPHICS

This project has been a combined effort between the deaf population of Portland, Oregon and the operators of the Tri-County Metropolitan Transportation District of Oregon (Tri-Met).

Approvals and contributions applying to the use and understanding of these picture graphics have been made by Centers for the Deaf around the United States.

The contributions by the deaf and hard of hearing came from those individuals using only American Sign Language (ASL), those using combinations of "home signs" and ASL, Oral Deaf, or combinations of these communication methodologies.

With grateful acknowledgement to:

Project ACTION of the National Easter Seal Society for the generous grant that funded this project. A special thank you to the U.S. Congress for sustaining and including the funding of Project ACTION for this and future projects through the budget of the Federal Transit Administration.

Patricia Nielsen, Co-Project Manager, Tri-Met, Portland, Oregon.

Judith Clark, Co-Project Manager, Oregon Deaf Resources Center, Portland, Oregon.

Your Public Transportation System Working to Improve Communications for Our Deaf and Hard of Hearing Passengers

In a cooperative effort between the deaf and hard of hearing communities across the nation and public transportation, studies have been conducted to improve public transportation communication methods.

As only one outcome of this study, picture language has been developed as an improved method of communication between you, the rider, and your bus operator.

The following eleven "pictures" are graphic illustrations of the answers to the most often asked questions about activities that may take place while you're riding public transportation.

Next to the picture graphics you will find the explanation of what the "picture" means.

You will only see these picture graphics displayed by the bus operator when delays or route changes take place. If you have further questions, concerns, or want additional information, contact your area's transit authority.

DELAYS AND DETOURS

Not knowing how long a delay will be, or why a detour is being taken can be frustrating. The following picture graphics were designed to assist in a better understanding about how long a delay will be and why a detour is taken.

Break Down
Delay is caused by mechanical problems.

First Aid
Delay is caused by a medical emergency. If you need medical attention, point to this picture graphic.

Flat Tire
Delay is caused by a flat tire.

Accident
Delay is caused by an accident.

Bridge Up
Delay is due to a bridge being up.

Construction Detour
Bus is taking an alternate route due to construction.

Weather Condition Detour
Bus is taking an alternate route due to weather conditions.

Accident Detour
Bus is taking an alternate route due to an accident.

Last Stop
The bus has reached its last stop.

DURATION OF DELAY

Delay, Less Than Ten Minutes
This picture graphic may be shown alone or with another picture graphic explaining the reason for the delay.

Delay, More Than Ten Minutes
This picture graphic may be shown alone or with another picture graphic explaining the reason for the delay.

L-R: Mark Linstrom, Persident, Oregon Deaf Resources Center - ODRC; Judy Clark Project Co-Principle Investigator ODRC; Elaine Rice, Tri-Met Operator; Dr. Holly Jimmison, Director, Informed Patient Decisions Group, Oregon Health Sciences University; Dr. Misha Pavel, Director, Center for Information Technology, Oregon Graduate Institute; Patty Nielsen, Project Co-Principle Investigator, (Tri-Met). Shown here with the International Pictograms to be used as communications tools for Tri-Met operators.